

REMARKS

AMENDMENTS

Claims 1-3, 8, 14-17, 20, and 22-23 are amended herein. The amendments introduce no new matter and place the claims in *prima facie* condition for allowance. Accordingly, applicants respectfully request that they be entered and that the case be passed to allowance.

REJECTION UNDER 35 USC §112, ¶2

The examiner maintains rejection of claim 22 under 35 USC §112, ¶2 for indefiniteness. Applicants again point out that the claim is drawn to compositions comprising an active ingredient mixed with conventional crop protection auxiliaries. No improper “use” is recited, as the adjectival phrase “which are conventionally used for formulating crop protection agents” simply modifies the noun “auxiliaries.” However, in order that the examiner may be entirely certain of this fact, applicants have amended claims 22 and 23 to place the modifying phrase in compound adjective form, now preceding the noun “auxiliaries.”

REJECTION UNDER 35 USC §112, ¶1

The examiner also maintains rejection of claims 1-12 and 14-24 under 35 USC §112, ¶1 for lack of enablement. It is the examiner's stated opinion that the specification “does not provide enablement for 3 cyanos, nitros or other electron

withdrawing groups on R¹ equal to phenoxy in the ortho position," or where R¹, R⁵, and R⁷-R⁹ include a heterocyclyl radical. Though applicants remain convinced that one of skill in the art would find ample support in the present specification to make and use the entire range of compounds as originally claimed, to speed prosecution, the claims have been amended to accommodate the examiner's views. These amendments should not in any way be viewed as acquiescence in the examiner's considered opinion.

The claims are amended to remove the possibility for phenoxy to be substituted by more than two electron withdrawing groups, and to remove all heterocyclic radicals from R⁵ and R⁷-R⁹. Accordingly, the examiner's concerns on the issue of enablement should be met, and per the examiner's view, the claims are now in condition for allowance.

CONCLUSION

In view of the accompanying amendments and remarks, applicants consider that the rejections of record have been obviated and respectfully solicit passage of the application to issue.

Please find attached a check to cover the \$950.00 three month extension fee.

Please charge any shortage in fees due in connection with the filing of this paper, including Extension of Time fees to Deposit Account No. 11-0345. Please credit any excess fees to such deposit account.

WITSCHER et al., Serial No. 09/763,704

Respectfully submitted,
KEIL & WEINKAUF

A handwritten signature in black ink, appearing to read 'David C. Liechty', with a long horizontal flourish extending to the right.

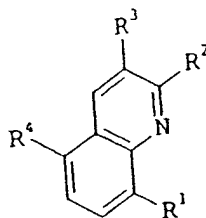
David C. Liechty
Reg. No. 48,692

1350 Connecticut Ave., N.W.
Washington, D.C. 20036
(202)659-0100

DCL/kas

COPY OF ALL CLAIMS

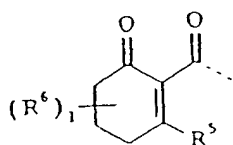
1. (currently amended) A cyclohexenonequinolinoyl derivative of the formula I



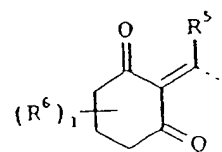
I

where:

R¹ is hydrogen, nitro, halogen, cyano, C₁-C₆-alkyl, C₁-C₆-haloalkyl, C₁-C₆-alkoxyiminomethyl, C₁-C₆-alkoxy, C₁-C₆-haloalkoxy, C₁-C₆-alkylthio, C₁-C₆-haloalkylthio, C₁-C₆-alkylsulfinyl, C₁-C₆-haloalkylsulfinyl, C₁-C₆-alkylsulfonyl, C₁-C₆-haloalkylsulfonyl, aminosulfonyl, N-(C₁-C₆-alkyl)aminosulfonyl, N, N-di-(C₁-C₆-alkyl) aminosulfonyl , N-(C₁-C₆-alkylsulfonyl)amino, N-(C₁-C₆-haloalkylsulfonyl)amino, N-(C₁-C₆-alkyl)-N-(C₁-C₆-alkylsulfonyl)amino, N-(C₁-C₆-alkyl)-N-(C₁-C₆-haloalkylsulfonyl)amino, phenoxy, heterocycloxy, phenylthio or heterocyclylthio, it being possible for the four last-mentioned radicals to be partially or fully halogenated and/or to carry one to two of the following ~~one to three of the following~~ substituents :
nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;
R², R³ are hydrogen, C₁-C₆-alkyl, C₁-C₆-haloalkyl or halogen;
R⁴ is a compound IIa or IIb



I Ia



I Ib

where

R^5 is halogen, OR^7 , SR^7 , SOR^8 , SO_2R^8 , OSO_2R^8 , POR^8R^9 , OPR^8R^9 , $OPOR^8R^9$, $OPSR^8R^9$, $NR^{10}R^{11}$, $ONR^{11}R^{12}$, ~~N-linked heterocyclyl or O-(N-linked heterocyclyl)~~, it being possible for the heterocyclyl radical of the two last-mentioned substituents to be partially or fully halogenated and/or to carry one to three of the following radicals: nitro, cyano, ~~C_1-C_4 -alkyl, C_1-C_4 -haloalkyl, C_1-C_4 -alkoxy or C_1-C_4 -haloalkoxy~~;

R^6 is nitro, halogen, cyano, C_1-C_6 -alkyl, C_1-C_6 -haloalkyl, di- $(C_1-C_6$ -alkoxy)methyl, di- $(C_1-C_6$ -alkylthio)methyl, $(C_1-C_6$ -alkoxy) $(C_1-C_6$ -alkylthio)methyl, hydroxyl, C_1-C_6 -alkoxy, C_1-C_6 -haloalkoxy, C_1-C_6 -alkoxycarbonyloxy, C_1-C_6 -alkylthio, C_1-C_6 -haloalkylthio, C_1-C_6 -alkylsulfinyl, C_1-C_6 -haloalkylsulfinyl, C_1-C_6 -alkylsulfonyl, C_1-C_6 -haloalkylsulfonyl, C_1-C_6 -alkylcarbonyl, C_1-C_6 -haloalkylcarbonyl, C_1-C_6 -alkoxycarbonyl or C_1-C_6 -haloalkoxycarbonyl;

or

two radicals, which are linked to the same carbon, together form an $-O-(CH_2)_m-O-$, $-O-(CH_2)_m-S-$, $-S-(CH_2)_m-S-$, $-O-(CH_2)_n-$ or $-S-(CH_2)_n$ chain which is unsubstituted or substituted by one to three radicals from the following group: halogen, cyano, C_1-C_4 -alkyl, C_1-C_4 -haloalkyl or C_1-C_4 -alkoxycarbonyl;

or

two radicals , which are linked to the same carbon,
together form a $-(CH_2)_p$ chain which possibly is interrupted by
oxygen or sulfur and/or is unsubstituted or substituted by one to
four radicals from the following group:
halogen, cyano, C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl or C_1 - C_4 -
alkoxycarbonyl;

or

two radicals , which are linked to the same carbon,
together form a methyldene group which is unsubstituted or
substituted by one or two radicals from the following group:
halogen, hydroxyl, formyl, cyano, C_1 - C_6 -alkyl, C_1 - C_6 -haloalkyl, C_1 -
 C_6 -alkoxy, C_1 - C_6 -haloalkoxy, C_1 - C_6 -alkylthio, C_1 - C_6 -haloalkylthio, C_1 -
 C_6 -alkylsulfinyl, C_1 - C_6 -haloalkylsulfinyl, C_1 - C_6 -alkylsulfonyl or C_1 - C_6 -
haloalkylsulfonyl;

or

two radicals , which are linked to the same carbon,
together with this carbon form a carbonyl group;

or

two radicals , which are linked to different carbons,
together form a $-(CH_2)_n$ chain which is unsubstituted or substituted
by one to three radicals from the following group:
halogen, C_1 - C_6 -alkyl, C_1 - C_6 -alkoxy, hydroxyl or C_1 - C_6 -
alkoxycarbonyl;

R^7 is C_1 - C_6 ,-alkyl, C_3 - C_6 -alkenyl, C_3 - C_6 -haloalkenyl,
 C_3 - C_6 -alkynyl, C_3 - C_6 -haloalkynyl, C_3 - C_6 -cyloalkyl,
 C_1 - C_{20} -alkylcarbonyl, C_2 - C_6 -alkenylcarbonyl,
 C_2 - C_6 -alkynylcarbonyl, C_3 - C_6 -cyloalkylcarbonyl,
 C_1 - C_6 -alkoxycarbonyl, C_3 - C_6 -alkenyloxycarbonyl,

C₃-C₆-alkynyloxycarbonyl,
(C₁-C₂₀-alkylthio)carbonyl,
C₁-C₆-alkylaminocarbonyl,
C₃-C₆-alkenylaminocarbonyl,
C₃-C₆-alkynylaminocarbonyl,
N,N-di-(C₁-C₆-alkyl)aminocarbonyl,
N-(C₃-C₆-alkenyl)-N-(C₁-C₆-alkyl)aminocarbonyl,
N-(C₃-C₆-alkynyl)-N-(C₁-C₆-alkyl)aminocarbonyl,
N-(C₁-C₆-alkoxy)-
N-(C₁-C₆-alkyl)aminocarbonyl, N-(C₃-C₆-alkenyl)-
N-(C₁-C₆-alkoxy)aminocarbonyl, N-(C₃-C₆-alkynyl)-
N-(C₁-C₆-alkoxy)aminocarbonyl, di-(C₁-C₆-alkyl)-
aminothiocarbonyl, C₁-C₆-alkylcarbonyl-C₁-C₆-alkyl,
C₁-C₆-alkoxyimino-C₁-C₆-alkyl,
N-(C₁-C₆-alkylamino)imino-C₁-C₆-alkyl or
N,N-di-(C₁-C₆-alkylamino)imino-C₁-C₆-alkyl, it being possible for
the above-mentioned alkyl, cycloalkyl and alkoxy radicals to be partially or
fully halogenated and/or to carry one to three of the following groups:
cyano, C₁-C₄-alkoxy, C₁-C₄-alkylthio, di-(C₁-C₄-alkyl)amino, C₁-C₄-
alkylcarbonyl, C₁-C₄-alkoxycarbonyl, C₁-C₄-alkoxy-C₁-C₄-
alkoxycarbonyl, di-(C₁-C₄-alkyl)amino-C₁-C₄-alkoxycarbonyl,
hydroxycarbonyl, C₁-C₄-alkylaminocarbonyl, di-(C₁-C₄-
alkyl)aminocarbonyl, aminocarbonyl, C₁-C₄-alkylcarbonyloxy or C₃-
C₆-cycloalkyl;
phenyl, phenyl-C₁-C₆-alkyl, phenylcarbonyl-C₁-C₆-alkyl,
phenylcarbonyl, phenoxycarbonyl, phenoxythiocarbonyl, phenoxy-
C₁-C₆-alkylcarbonyl, phenylaminocarbonyl, N-(C₁-C₆-alkyl)-N-
(phenyl)aminocarbonyl, or phenyl-C₂-C₆-alkenylcarbonyl, it being

possible for the phenyl radical of the 10 last-mentioned substituents to be partially or fully halogenated and/or to carry one to three of the following radicals:

~~phenyl, phenyl-G₄-G₆-alkyl, heterocyclyl-G₄-G₆-alkyl, phenylcarbonyl-G₄-G₆-alkyl, heterocyclylcarbonyl-G₄-G₆-alkyl, phenylcarbonyl, heterocyclylcarbonyl, phenoxycarbonyl, heterocyclyloxycarbonyl, phenoxythiocarbonyl, heterocyclyloxythiocarbonyl, phenoxy-G₄-G₆-alkylcarbonyl, heterocyclyloxy-G₄-G₆-alkylcarbonyl, phenylaminocarbonyl, N-(G₄-G₆-alkyl)-N-(phenyl)aminocarbonyl, heterocyclylaminocarbonyl, N-(G₄-G₆-alkyl)-N-(heterocyclyl)aminocarbonyl, phenyl-G₂-G₆-alkenylcarbonyl or heterocyclyl-G₂-G₆-alkenylcarbonyl, it being possible for the phenyl and the heterocyclyl radical of the 20 last-mentioned substituents to be partially or fully halogenated and/or to carry one to three of the following radicals:~~

~~nitro, cyano, C₁-C₄-alkyl, C₁-C₄-halogenalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;~~

R⁸, R⁹ are C₁-C₆-alkyl, C₃-C₆-alkenyl, C₃-C₆-haloalkenyl, C₃-C₆-alkynyl, C₃-C₆-haloalkynyl, C₃-C₆-cycloalkyl, hydroxyl, C₁-C₆-alkoxy, amino, C₁-C₆-alkylamino, C₁-C₆-haloalkylamino, di-(C₁-C₆-alkyl) amino or di-(C₁-C₆-haloalkyl) amino, it being possible for the abovementioned alkyl, cycloalkyl and alkoxy radicals to be partially or fully halogenated and/or to carry one to three of the following groups: cyano, C₁-C₄-alkoxy, C₁-C₄-alkylthio, di-(C₁-C₄-alkyl) amino, C₁-C₄-alkylcarbonyl, C₁-C₄-alkoxycarbonyl, C₁-C₄-alkoxy-C₁-C₄-alkoxycarbonyl, di-(C₁-C₄-alkyl) amino-C₁-C₄-alkoxycarbonyl, hydroxycarbonyl, C₁-C₄-alkylaminocarbonyl, di-(C₁-C₄-alkyl) aminocarbonyl, aminocarbonyl, C₁-C₄-alkylcarbonyloxy or C₃-C₆-cycloalkyl;

phenyl, phenyl-C₁-C₆-alkyl, phenoxy, it being possible for the phenyl radical of the last-mentioned substituents to be partially or fully halogenated and/or to carry one to three of the following radicals:

~~phenyl, heterocyclyl, phenyl-C₁-C₆-alkyl, heterocyclyl-C₁-C₆-alkyl, phenoxy, heterocycliloxy, it being possible for the phenyl and the heterocyclyl radical of the last-mentioned substituents to be partially or fully halogenated and/or to carry one to three of the following radicals:~~
nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R¹⁰ is C₁-C₆-alkyl, C₃-C₆-alkenyl, C₃-C₆-haloalkenyl, C₃-C₆-alkynyl, C₃-C₆-haloalkynyl, C₃-C₆-cycloalkyl, hydroxyl, C₁-C₆-alkoxy, C₃-C₆-alkenyloxy, C₃-C₆-alkynyloxy, amino, C₁-C₆-alkylamino, di-(C₁-C₆-alkyl)amino or C₁-C₆-alkylcarbonylamino, where the abovementioned alkyl, cycloalkyl and alkoxy radicals may be partially or fully halogenated and/or may carry one to three radicals from the following group:

cyano, C₁-C₄-alkoxy, C₁-C₄-alkylthio, di-(C₁-C₄-alkyl)amino, C₁-C₄-alkylcarbonyl, C₁-C₄-alkoxycarbonyl, C₁-C₄-alkoxy-C₁-C₄-alkoxycarbonyl, di-(C₁-C₄-alkyl)amino-C₁-C₄-alkoxycarbonyl, hydroxycarbonyl, C₁-C₄-alkylaminocarbonyl, di-(C₁-C₄-alkyl)aminocarbonyl, aminocarbonyl, C₁-C₄-alkylcarbonyloxy or C₃-C₆-cycloalkyl;

phenyl, or phenyl-C₁-C₆-alkyl, where the phenyl radical of the two last-mentioned substituents may be partially or fully halogenated and/or may carry one to three of the following radicals:

~~phenyl, heterocyclyl, phenyl-C₁-C₆-alkyl or heterocyclyl-C₁-C₆-alkyl, where the phenyl or heterocyclyl radical of the four last-mentioned substituents may be partially or fully halogenated and/or may carry one to three of the~~

~~following radicals:~~

nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R¹¹, R¹² are C₁-C₆-alkyl, C₃-C₆-alkenyl, C₃-C₆-alkynyl or C₁-C₆-alkylcarbonyl;

l is 0 to 6;

m is 2 to 4;

n is 1 to 5;

p is 2 to 5;

and their agriculturally useful salts.

2. (currently amended) A cyclohexenonequinolinoyl derivative of the formula I as claimed in claim 1 where

R¹ is halogen, C₁-C₆-alkyl, C₁-C₆-haloalkyl, C₁-C₆-alkoxy, C₁-C₆-alkylthio, heterocycloxy or phenylthio, it being possible for the two last-mentioned radicals to be partially or fully halogenated and/or to carry one to two ~~carry one to three~~ of the substituents mentioned below:

nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R⁵ is halogen, OR⁷, SR⁷, SOR⁸, SO₂R⁸, OSO₂R⁸, OPR⁸R⁹, OPOR⁸R⁹, OPSR⁸R⁹, NR¹⁰R¹¹ or N-bonded heterocyclyl, ~~which is unsubstituted or partially or fully halogenated and/or carries one to three of the following radicals:~~

~~nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy.~~

3. (currently amended) A cyclohexenonequinolinoyl derivative of the formula I as claimed in claim I, where

R⁵ is halogen, OR⁷, NR¹⁰R¹¹ or N-bonded heterocyclyl ~~which is unsubstituted~~

~~or partially or fully halogenated and/or carries one to three of the following radicals:~~

~~nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy.~~

4. (previously presented) A cyclohexenonequinolinoyl derivative of the formula I as claimed in claim 1, where

R⁷ is C₁-C₆-alkyl, C₁-C₂₀-alkylcarbonyl, C₁-C₆-alkoxycarbonyl, (C₁-C₂₀-alkylthio)carbonyl, N,N-di-(C₁-C₆-alkyl)aminocarbonyl, phenyl, phenylcarbonyl or phenoxy-C₁-C₆-alkylcarbonyl, it being possible for the phenyl radical of the three last-mentioned substituents to be partially or fully halogenated and/or to carry one to three of the following radicals:

nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R¹⁰ is C₁-C₆-alkyl or C₁-C₆-alkoxy;

R¹¹ is C₁-C₆-alkyl.

5. (previously presented) A cyclohexenonequinolinoyl derivative of the formula I as claimed in claim 1, where

R⁶ is nitro, halogen, cyano, C₁-C₆-alkyl, C₁-C₆-haloalkyl, di-(C₁-C₆-alkoxy)methyl, di-(C₁-C₆-alkylthio)methyl, (C₁-C₆-alkoxy)(C₁-C₆-alkylthio)-methyl, hydroxyl, C₁-C₆-alkoxy, C₁-C₆-haloalkoxy, C₁-C₆-alkoxycarbonyloxy, C₁-C₆-alkylthio, C₁-C₆-haloalkylthio, C₁-C₆-alkylsulfinyl, C₁-C₆-haloalkylsulfinyl, C₁-C₆-alkylsulfonyl, C₁-C₆-haloalkylsulfonyl, C₁-C₆-alkylcarbonyl, C₁-C₆-haloalkylcarbonyl, C₁-C₆-alkoxycarbonyl or C₁-C₆-haloalkoxycarbonyl;

or

two radicals , which are linked to the same carbon, together form an $-O-(CH_2)_m-O-$, $-O-(CH_2)_m-S-$, $-S-(CH_2)_m-S-$, $-O-(CH_2)_n-$ or $-S-(CH_2)_n$ chain which is unsubstituted or substituted by one to three radicals from the following group :

halogen, cyano, C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl or C_1 - C_4 -alkoxycarbonyl;

or

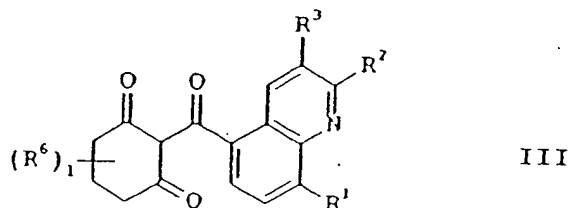
two radicals , which are linked to the same carbon, together form a $-(CH_2)_p$ chain which possibly is interrupted by oxygen or sulfur and which is unsubstituted or substituted by one to four radicals from the following group :

halogen, cyano, C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl or C_1 - C_4 -alkoxycarbonyl ;

or

two radicals , which are linked to the same carbon, together with this carbon form a carbonyl group.

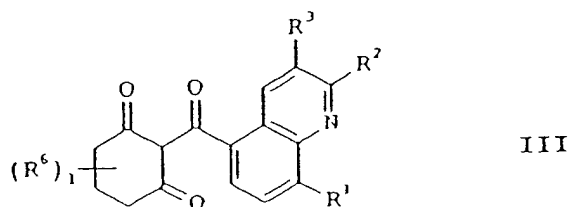
6. (previously presented) A process for preparing compounds of the formula I as claimed in claim 1 where R^5 = halogen, which comprises reacting a cyclohexanedione derivative of the formula III,



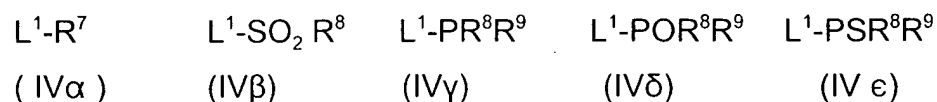
where the variables R^1 to R^3 , and I are each as defined in claim 1, with a halogenating agent.

7. (previously presented) A process for preparing compounds of the formula I as

claimed in claim 1 where $R^5 = OR^7$, OSO_2R^8 , OPR^8R^9 , $OPOR^8R^9$ or $OPSR^8R^9$, which comprises reacting a cyclohexanedione derivative of the formula III,

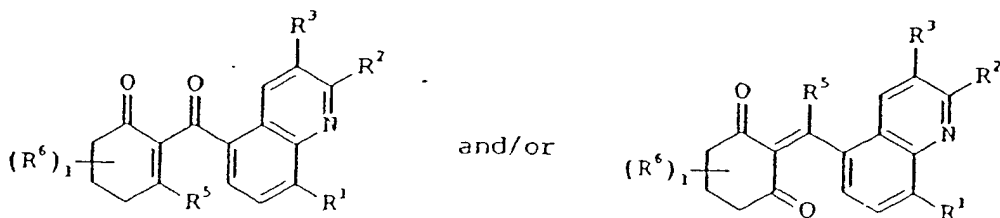


where the variables R^1 to R^3 , and I are each as defined in claim 1, with a compound of the formula IV α , IV β , IV γ , IV δ or IV ϵ ,



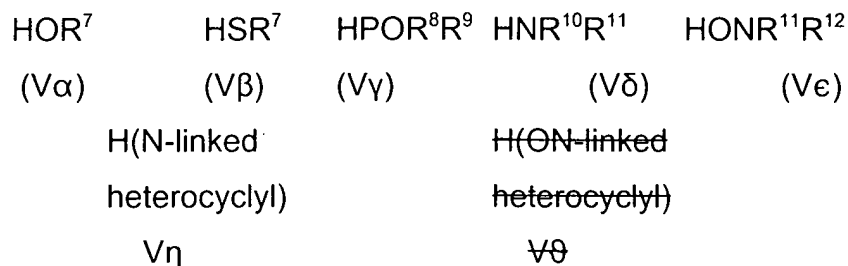
where the variables R^7 to R^9 are each as defined in claim 1 and L^1 is a nucleophilically replaceable leaving group.

8. (currently amended) A process for preparing compounds of the formula I as claimed in claim 1 where $R^5 = OR^7$, SR^7 , POR^8R^9 , $NR^{10}R^{11}$, $ONR^{11}R^{12}$, or N-linked heterocyclyl ~~N-linked heterocyclyl or O-(N-linked heterocyclyl)~~, which comprises reacting a compound of the formula I α (\equiv I where $R^5 = \text{halogen, } OSO_2R^8$),



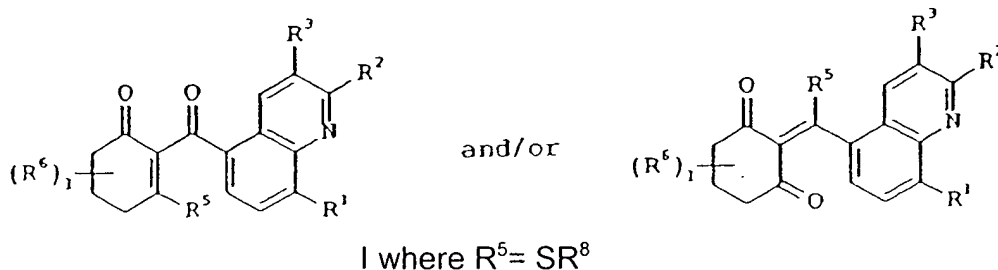
I where $R^5 = \text{halogen or } \text{OSO}_2R^8$

where the variables R^1 to R^3 , R^6 and I are each as defined in claim 1, with a compound of the formula $V\alpha, V\beta, V\gamma, V\delta, V\epsilon, V\eta, V\theta$,



where the variables R^7 to R^{12} are each as defined in claim 1, if appropriate in the presence of a base.

9. (previously presented) A process for preparing compounds of the formula I as claimed in claim 1, where $R^5 = \text{SOR}^8, \text{SO}_2R^8$, which comprises reacting a compound of the formula I β (\equiv I where $R^5 = \text{SR}^8$),



where the variables R^1 to R^8 and I are each as defined in claim 1, with an oxidizing agent.

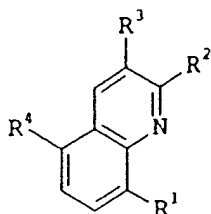
10. (previously presented) A composition, comprising a herbicidally effective amount of at least one cyclohexenonequinolinoyl derivative of the formula I or an agriculturally useful salt of formula I as claimed in claim 1 and auxiliaries which are conventionally used for formulating crop protection agents.
11. (previously presented) A process for preparing a composition as claimed in claim

10, which comprises mixing a herbicidally effective amount of at least one cyclohexenonequinolinoyl derivative of the formula I or an agriculturally useful salt of formula I and auxiliaries which are conventionally used for formulating crop protection agents.

12. (previously presented) A method for controlling undesirable vegetation, which comprises allowing a herbicidally effective amount of at least one cyclohexenonequinolinoyl derivative of the formula I or an agriculturally useful salt of formula I as claimed in claim 1 to act on plants, their habitat and/or on seeds.

13. (canceled)

14. (currently amended) A cyclohexenonequinolinoyl derivative of the formula I



where:

R¹ is hydrogen, nitro, halogen, cyano, C₁-C₆-alkyl, C₁-C₆-haloalkyl, C₁-C₆-alkoxyiminomethyl, C₁-C₆-alkoxy, C₁-C₆-haloalkoxy, C₁-C₆-alkylthio, C₁-C₆-haloalkylthio, C₁-C₆-alkylsulfinyl, C₁-C₆-haloalkylsulfinyl, C₁-C₆-alkylsulfonyl, C₁-C₆-haloalkylsulfonyl, aminosulfonyl, N-(C₁-C₆-alkyl)aminosulfonyl, N, N-di-(C₁-C₆-alkyl) aminosulfonyl , N-(C₁-C₆-alkylsulfonyl)amino,

N-(C₁-C₆-haloalkylsulfonyl)amino,

N-(C₁-C₆-alkyl)-N-(C₁-C₆-alkylsulfonyl)amino,

N-(C₁-C₆-alkyl)-N-(C₁-C₆-haloalkylsulfonyl)amino,

phenoxy, heterocycloxy, phenylthio or heterocyclylthio, it being possible

for the four last-mentioned radicals to be partially or fully halogenated

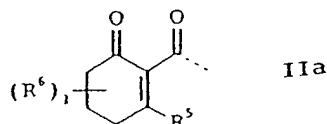
and/or to carry one to two ~~one to three~~ of the following substituents :

nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl,

C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R², R³ are hydrogen, C₁-C₆-alkyl, C₁-C₆-haloalkyl or halogen;

R⁴ is a compound IIa



where

R⁵ is halogen, OR⁷, SR⁷, SOR⁸, SO₂R⁸, OSO₂R⁸, POR⁸R⁹, OPR⁸R⁹, OPOR⁸R⁹, OPSR⁸R⁹, NR¹⁰R¹¹, ONR¹¹R¹², N-linked heterocyclyl or O-(N-linked heterocyclyl), ~~it being possible for the heterocyclyl radical of the two last-mentioned substituents to be partially or fully halogenated and/or to carry one to three of the following radicals:~~ nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R⁶ is nitro, halogen, cyano, C₁-C₆-alkyl, C₁-C₆-haloalkyl, di-(C₁-C₆-alkoxy)methyl, di-(C₁-C₆-alkylthio)methyl, (C₁-C₆-alkoxy)(C₁-C₆-alkylthio)methyl, hydroxyl, C₁-C₆-alkoxy, C₁-C₆-haloalkoxy, C₁-C₆-alkoxycarbonyloxy, C₁-C₆-alkylthio, C₁-C₆-haloalkylthio, C₁-C₆-alkylsulfinyl, C₁-C₆-haloalkylsulfinyl, C₁-C₆-alkylsulfonyl, C₁-C₆-haloalkylsulfonyl, C₁-C₆-alkylcarbonyl,

C₁-C₆-haloalkylcarbonyl, C₁-C₆-alkoxycarbonyl or
C₁-C₆-haloalkoxycarbonyl;

or

two radicals , which are linked to the same carbon,
together form an -O-(CH₂)_m-O-, -O-(CH₂)_m-S-, -S-(CH₂)_m-S-, -O-
(CH₂)_n- or -S-(CH₂)_n chain which is unsubstituted or substituted by
one to three radicals from the following group:
halogen, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl or C₁-C₄-
alkoxycarbonyl;

or

two radicals , which are linked to the same carbon,
together form a -(CH₂)_p chain which possibly is interrupted by
oxygen or sulfur and/or is unsubstituted or substituted by one to
four radicals from the following group:
halogen, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl or C₁-C₄-
alkoxycarbonyl;

or

two radicals , which are linked to the same carbon,
together form a methylenedioxy group which is unsubstituted or
substituted by one or two radicals from the following group:
halogen, hydroxyl, formyl, cyano, C₁-C₆-alkyl, C₁-C₆-haloalkyl, C₁-
C₆-alkoxy, C₁-C₆-haloalkoxy, C₁-C₆-alkylthio, C₁-C₆-haloalkylthio, C₁-
C₆-alkylsulfinyl, C₁-C₆-haloalkylsulfinyl, C₁-C₆-alkylsulfonyl or C₁-C₆-
haloalkylsulfonyl;

or

two radicals , which are linked to the same carbon,
together with this carbon form a carbonyl group;

or

two radicals, which are linked to different carbons,
together form a $-(CH_2)_n$ chain which is unsubstituted or substituted
by one to three radicals from the following group:
halogen, C_1 - C_6 -alkyl, C_1 - C_6 -alkoxy, hydroxyl or C_1 - C_6 -
alkoxycarbonyl;

R^7 is C_1 - C_6 -alkyl, C_3 - C_6 -alkenyl, C_3 - C_6 -haloalkenyl,
 C_3 - C_6 -alkynyl, C_3 - C_6 -haloalkynyl, C_3 - C_6 -cycloalkyl,
 C_1 - C_{20} -alkylcarbonyl, C_2 - C_6 -alkenylcarbonyl,
 C_2 - C_6 -alkynylcarbonyl, C_3 - C_6 -cycloalkylcarbonyl,
 C_1 - C_6 -alkoxycarbonyl, C_3 - C_6 -alkenyloxy carbonyl,
 C_3 - C_6 -alkynyloxy carbonyl,
(C_1 - C_{20} -alkylthio)carbonyl,
 C_1 - C_6 -alkylaminocarbonyl,
 C_3 - C_6 -alkenylaminocarbonyl,
 C_3 - C_6 -alkynylaminocarbonyl,
N,N-di-(C_1 - C_6 -alkyl)aminocarbonyl,
N-(C_3 - C_6 -alkenyl)-N-(C_1 - C_6 -alkyl) aminocarbonyl,
N-(C_3 - C_6 -alkynyl)-N-(C_1 - C_6 -alkyl) aminocarbonyl,
N-(C_1 - C_6 -alkoxy)-
N-(C_1 - C_6 -alkyl) aminocarbonyl, N-(C_3 - C_6 -alkenyl)-
N-(C_1 - C_6 -alkoxy) aminocarbonyl, N-(C_3 - C_6 -alkynyl)-
N-(C_1 - C_6 -alkoxy) aminocarbonyl, di-(C_1 - C_6 -alkyl)-
aminothiocarbonyl, C_1 - C_6 -alkylcarbonyl- C_1 - C_6 -alkyl,
 C_1 - C_6 -alkoxyimino- C_1 - C_6 -alkyl,
N-(C_1 - C_6 -alkylamino) imino- C_1 - C_6 -alkyl or
N,N-di-(C_1 - C_6 -alkylamino)imino- C_1 - C_6 -alkyl, it being possible for
the above-mentioned alkyl, cycloalkyl and alkoxy radicals to be partially or

fully halogenated and/or to carry one to three of the following groups:
cyano, C₁-C₄-alkoxy, C₁-C₄-alkylthio, di-(C₁-C₄-alkyl)amino, C₁-C₄-alkylcarbonyl, C₁-C₄-alkoxycarbonyl, C₁-C₄-alkoxy-C₁-C₄-alkoxycarbonyl, di-(C₁-C₄-alkyl)amino-C₁-C₄-alkoxycarbonyl, hydroxycarbonyl, C₁-C₄-alkylaminocarbonyl, di-(C₁-C₄-alkyl)aminocarbonyl, aminocarbonyl, C₁-C₄-alkylcarbonyloxy or C₃-C₆-cycloalkyl;

phenyl, phenyl-C₁-C₆-alkyl, phenylcarbonyl-C₁-C₆-alkyl, phenylcarbonyl, phenoxycarbonyl, phenoxythiocarbonyl, phenoxy-C₁-C₆-alkylcarbonyl, phenylaminocarbonyl, N-(C₁-C₆-alkyl)-N-(phenyl)aminocarbonyl, or phenyl-C₂-C₆-alkenylcarbonyl, it being possible for the phenyl radical of the 10 last-mentioned substituents to be partially or fully halogenated and/or to carry one to three of the following radicals:

~~phenyl, heterocyclyl, phenyl-C₄-C₆-alkyl, heterocyclyl-C₄-C₆-alkyl, phenylcarbonyl-C₄-C₆-alkyl, heterocyclylcarbonyl-C₄-C₆-alkyl, phenylcarbonyl, heterocyclylcarbonyl, phenoxycarbonyl, heterocycliloxy carbonyl, phenoxythiocarbonyl, heterocycliloxythiocarbonyl, phenoxy-C₄-C₆-alkylcarbonyl, heterocycliloxy-C₄-C₆-alkylcarbonyl, phenylaminocarbonyl, N-(C₄-C₆-alkyl)-N-(phenyl)aminocarbonyl, heterocyclylaminocarbonyl, N-(C₄-C₆-alkyl)-N-(heterocyclyl)aminocarbonyl, phenyl-C₂-C₆-alkenylcarbonyl or heterocyclyl-C₂-C₆-alkenylcarbonyl, it being possible for the phenyl and the heterocyclyl radical of the 20 last-mentioned substituents to be partially or fully halogenated and/or to carry one to three of the following radicals:~~

~~nitro, cyano, C₁-C₄-alkyl, C₁-C₄-halogenalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;~~

R⁸, R⁹ are C₁-C₆-alkyl, C₃-C₆-alkenyl, C₃-C₆-haloalkenyl, C₃-C₆-alkynyl, C₃-C₆-haloalkynyl, C₃-C₆-cycloalkyl, hydroxyl, C₁-C₆-alkoxy, amino, C₁-

C₆-alkylamino, C₁-C₆-haloalkylamino, di-(C₁-C₆-alkyl) amino or di-(C₁-C₆-haloalkyl)amino, it being possible for the abovementioned alkyl, cycloalkyl and alkoxy radicals to be partially or fully halogenated and/or to carry one to three of the following groups: cyano, C₁-C₄-alkoxy, C₁-C₄-alkylthio, di-(C₁-C₄-alkyl) amino, C₁-C₄-alkylcarbonyl, C₁-C₄-alkoxycarbonyl, C₁-C₄-alkoxy-C₁-C₄-alkoxycarbonyl, di-(C₁-C₄-alkyl)amino-C₁-C₄-alkoxycarbonyl, hydroxycarbonyl, C₁-C₄-alkylaminocarbonyl, di-(C₁-C₄-alkyl)aminocarbonyl, aminocarbonyl, C₁-C₄-alkylcarbonyloxy or C₃-C₆-cycloalkyl;

phenyl, phenyl-C₁-C₆-alkyl, phenoxy, it being possible for the phenyl radical of the last-mentioned substituents to be partially or fully halogenated and/or to carry one to three of the following radicals:

~~phenyl, heterocyclyl, phenyl-C₁-C₆-alkyl, heterocyclyl-C₁-C₆-alkyl, phenoxy, heterocyclyloxy, it being possible for the phenyl and the heterocyclyl radical of the last-mentioned substituents to be partially or fully halogenated and/or to carry one to three of the following radicals:~~
nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R¹⁰ is C₁-C₆-alkyl, C₃-C₆-alkenyl, C₃-C₆-haloalkenyl, C₃-C₆-alkynyl, C₃-C₆-haloalkynyl, C₃-C₆-cycloalkyl, hydroxyl, C₁-C₆-alkoxy, C₃-C₆-alkenyloxy, C₃-C₆-alkynyloxy, amino, C₁-C₆-alkylamino, di-(C₁-C₆-alkyl)amino or C₁-C₆-alkylcarbonylamino, it being possible for the abovementioned alkyl, cycloalkyl and alkoxy radicals to be partially or fully halogenated and/or to carry one to three radicals from the following group:
cyano, C₁-C₄-alkoxy, C₁-C₄-alkylthio, di-(C₁-C₄-alkyl)amino, C₁-C₄-alkylcarbonyl, C₁-C₄-alkoxycarbonyl, C₁-C₄-alkoxy-C₁-C₄-

alkoxycarbonyl, di-(C₁-C₄-alkyl)amino-C₁-C₄-alkoxycarbonyl, hydroxycarbonyl, C₁-C₄-alkylaminocarbonyl, di-(C₁-C₄-alkyl)aminocarbonyl, aminocarbonyl, C₁-C₄-alkylcarbonyloxy or C₃-C₆-cycloalkyl;

phenyl, or phenyl-C₁-C₆-alkyl, it being possible for the phenyl radical of the two last-mentioned substituents to be partially or fully halogenated and/or to carry one to three of the following radicals:

~~phenyl, heterocyclyl, phenyl-C₄-C₆-alkyl or heterocyclyl-C₄-C₆-alkyl, it being possible for the phenyl or heterocyclyl radical of the four last-mentioned substituents to be partially or fully halogenated and/or to carry one to three of the following radicals:~~

nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R¹¹, R¹² are C₁-C₆-alkyl, C₃-C₆-alkenyl, C₃-C₆-alkynyl or C₁-C₆-alkylcarbonyl;

l is 0 to 6;

m is 2 to 4;

n is 1 to 5;

p is 2 to 5;

and their agriculturally useful salts.

15. (currently amended) A cyclohexenonequinolinoyl derivative of the formula I as claimed in claim 14, where

R¹ is halogen, C₁-C₆-alkyl, C₁-C₆-haloalkyl, C₁-C₆-alkoxy, C₁-C₆-alkylthio, heterocycloxy or phenylthio, it being possible for the two last-mentioned radicals to be partially or fully halogenated and/or to carry one to two ~~one to three~~ of the substituents mentioned below:

nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R⁵ is halogen, OR⁷, SR⁷, SOR⁸, SO₂R⁸, OSO₂R⁸, OPR⁸R⁹, OPOR⁸R⁹, OPSR⁸R⁹, NR¹⁰R¹¹ or N-bonded heterocyclyl ~~which is unsubstituted or partially or fully halogenated and/or carries one to three of the following radicals:~~
~~nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy.~~

16. (currently amended) A cyclohexenonequinolinoyl derivative of the formula I as claimed in claim 14, where

R⁵ is halogen, OR⁷, NR¹⁰R¹¹ or N-bonded heterocyclyl ~~which is unsubstituted or partially or fully halogenated and/or carries one to three of the following radicals:~~
~~nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy.~~

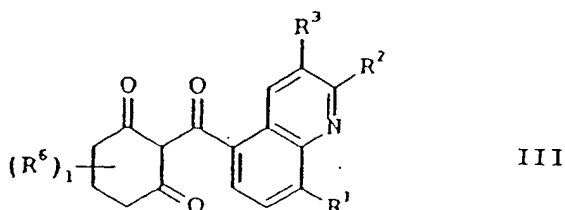
17. (currently amended) A cyclohexenonequinolinoyl derivative of the formula I as claimed in claim 14, where

R⁷ is C₁-C₆-alkyl, C₁-C₂₀-alkylcarbonyl, C₁-C₆-alkoxycarbonyl, (C₁-C₂₀-alkylthio)carbonyl, N,N-di-(C₁-C₆-alkyl)aminocarbonyl, phenyl, phenylcarbonyl or phenoxy-C₁-C₆-alkylcarbonyl, it being possible for the phenyl radical of the three last-mentioned substituents to be partially or fully halogenated and/or to carry one to three of the following radicals:
nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R¹⁰ is C₁-C₆-alkyl or C₁-C₆-alkoxy;

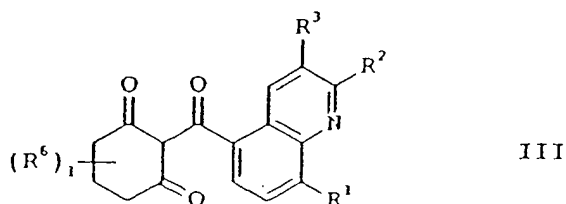
R¹¹ is C₁-C₆-alkyl.

18. (previously presented) A process for preparing compounds of the formula I as claimed in claim 14 where $R^5 = \text{halogen}$, which comprises reacting a cyclohexanedione derivative of the formula III,

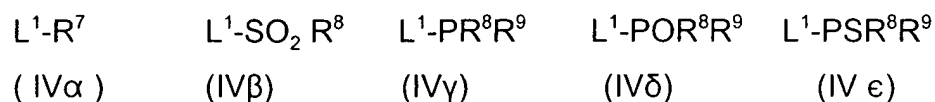


where the variables R^1 to R^3 , and I are each as defined in claim 14, with a halogenating agent.

19. (previously presented) A process for preparing compounds of the formula I as claimed in claim 14 where $R^5 = OR^7, OSO_2R^8, OPR^8R^9, OPOR^8R^9$ or $OPSR^8R^9$, which comprises reacting a cyclohexanedione derivative of the formula III,



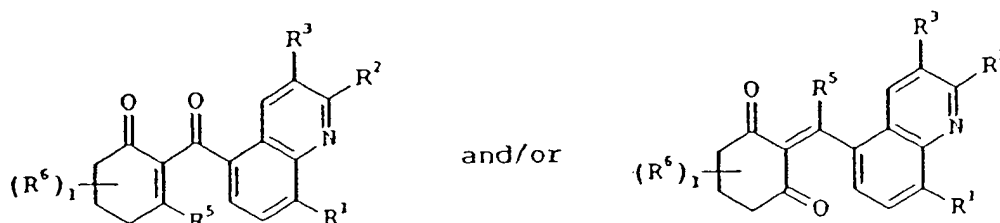
where the variables R^1 to R^3 , and I are each as defined in claim 14, with a compound of the formula IV α , IV β , IV γ , IV δ or IV ϵ ,



where the variables R^7 to R^9 are each as defined in claim 14 and L^1 is a nucleophilically replaceable leaving group.

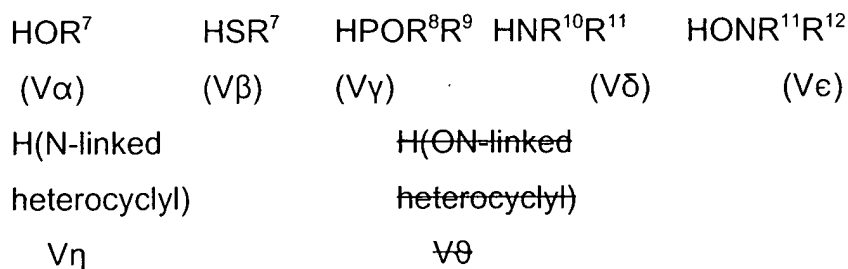
20. (currently amended) A process for preparing compounds of the formula I as claimed

in claim 14 where $R^5 = OR^7, SR^7, POR^8R^9, NR^{10}R^{11}, ONR^{11}R^{12}$, or N-linked heterocyclyl ~~N-linked heterocyclyl or O-(N-linked heterocyclyl)~~, which comprises reacting a compound of the formula I α (\equiv I where $R^5 = \text{halogen}, OSO_2R^8$),



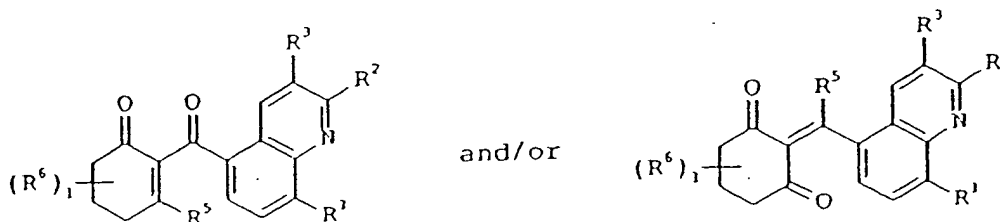
I where $R^5 = \text{halogen or } OSO_2R^8$

where the variables R^1 to R^3 , and I are each as defined in claim 14, with a compound of the formula $V\alpha, V\beta, Vy, V\delta, Ve, V\eta, V\theta$, ~~$V\alpha, V\beta, Vy, V\delta, Ve, V\eta, V\theta$~~ ,



where the variables R^7 to R^{12} are each as defined in claim 14, if appropriate in the presence of a base.

21. (previously presented) A process for preparing compounds of the formula I as claimed in claim 14 where $R^5 = SOR^8, SO_2R^8$, which comprises reacting a compound of the formula I β (\equiv I where $R^5 = SR^8$),



I where $R^5 = SR^8$

where the variables R^1 to R^5 , R^7 , R^8 and I are each as defined in claim 14, with an oxidizing agent.

22. (currently amended) A composition, comprising a herbicidally effective amount of at least one cyclohexenonequinolinoyl derivative of the formula I or an agriculturally useful salt of formula I as claimed in claim 14 and conventional crop protection formulation auxiliaries ~~which are conventionally used for formulating crop protection agents~~.
23. (currently amended) A process for preparing a composition as claimed in claim 22, which comprises mixing a herbicidally effective amount of at least one cyclohexenonequinolinoyl derivative of the formula I or an agriculturally useful salt of formula I and conventional crop protection formulation auxiliaries ~~which are conventionally used for formulating crop protection agents~~.
24. (previously presented) A method for controlling undesirable vegetation, which comprises allowing a herbicidally effective amount of at least one cyclohexenonequinolinoyl derivative of the formula I or an agriculturally useful salt of formula I as claimed in claim 14 to act on plants, their habitat and/or on seeds.
25. (canceled)